

What is claimed

1. A method for manufacturing a magnetoresistance apparatus, comprising the steps of:

5 forming a magnetoresistance element layer;

forming a photoresist pattern on said magnetoresistance element layer;

etching said magnetoresistance element layer by using said photoresist pattern as a mask; and

10 depositing a side layer by an ion beam sputtering process using said photoresist pattern as a mask after said magnetoresistance element layer is etched.

2. The method as set forth in claim 1, wherein said
15 photoresist pattern has a lower photoresist pattern and an upper photoresist pattern formed on said lower photoresist pattern, said lower photoresist pattern having a smaller area than said upper photoresist pattern.

20 3. The method as set forth in claim 2, wherein said lower photoresist pattern is approximately 0.05 to 0.3 μ m.

4. The method as set forth in claim 1, wherein a gas pressure in said ion beam sputtering process is about
25 4×10^{-4} to 4×10^{-2} Pa.

5. The method as set forth in claim 1, wherein ion beams used in said ion beam sputtering process are Ar ion beams.

30 6. The method as set forth in claim 1, wherein ion beams used in said ion beam sputtering process are Xe ion beams.

7. The method as set forth in claim 1, wherein a distance between a target and a substrate for said side layer in said ion beam sputtering process is
35 approximately 20 to 100 cm.

8. The method as set forth in claim 1, wherein said magnetoresistance element layer etching step carries

out an ion beam etching process.

9. The method as set forth in claim 1, wherein said magnetoresistance element layer etching step and said side depositing step are carried out in one chamber
5 without exposing said magnetoresistance apparatus to air.

10. The method as set forth in claim 1, wherein said magnetoresistance element layer comprises a spin valve type structure,
10 said side layer comprising a permanent magnet layer and an electrode layer formed on said permanent magnet layer.

11. The method as set forth in claim 1, wherein said magnetoresistance element layer comprises a
15 tunneling magnetoresistance type structure,
said side layer comprising an insulating layer and a permanent magnet layer formed on said insulating layer,

said method further comprising a step of
20 forming an electrode layer on said tunneling magnetoresistance structure.